

pacific

ENSO

update

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**A Quarterly Bulletin of the Pacific El Niño/Southern Oscillation Applications Center (PEAC)
Providing Information on Climate Variability for the U.S.-affiliated Pacific**

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CURRENT CONDITIONS

Most Micronesian islands have a distinct rainy season and dry season. The length of the rainy season and dry season is primarily a function of latitude. Islands closer to the equator (e.g., Pohnpei) have a short dry season and a long rainy season; islands further away from the equator (e.g., Guam and Saipan) have longer dry seasons. Most islands of Micronesia typically enter their dry season at the start of the calendar year; on some islands (especially those north of 10° N), the dry season persists until June or July. During years that follow a strong El Niño (e.g., 1983 and 1998), almost all of Micronesia experiences a long and prolonged dry season.

In contrast the rainy season in American Samoa occurs during the dry season in Micronesia, and vice versa. The effects of ENSO on the rainfall in American Samoa are somewhat less defined than in Micronesia with a tendency for dry conditions to be experienced after a strong El Niño and wet conditions experienced during weak La Niña.

2006 started out with climate patterns typical of weak La Niña that later relaxed to those expected for ENSO-Neutral conditions. Most of the statistical and dynamic forecast guidance suggested that most islands of Micronesia and American Samoa would be wetter than normal under this scenario. Throughout the first half of 2006, however, many islands were drier than anticipated by the models and official PEAC forecasts (**Fig 1a, 1b**). Overall, Micronesian weather during the first half of 2006 was very tranquil with few extremes of very wet or very dry conditions. Much of Hawaii and American Samoa had a very wet 1st quarter followed by drier 2nd quarter conditions. During the first six months of the calendar year 2006 rainfall totals were less than 80% of normal at some locations within Yap State, the northern RMI, Guam and the CNMI. Rainfall totals in excess of 120% of normal occurred in only a few locations in Micronesia—including some of the outer Islands of Pohnpei State (Nukuoro and Kapingamarangi), and the southern RMI (Mili)—and in American Samoa and Hawaii. The highest rainfall total recorded in Micronesia for the first six months of 2006 was at Kosrae airport with 106.54 inches; Nukuoro and Palikir followed next with 100.25 inches and 95.64 inches, respectively. The highest rainfall amount on Kosrae was, ironically, slightly less than normal (98%). The lowest recorded rainfall total in Micronesia during the first half of 2006 was the 14.91 inches at Tinian in the CNMI. Only some rainfall totals in the CNMI,

Guam and in the northern RMI were less than 20 inches during the first half of 2006.

At the end of June, the monsoon trough worked its way into the western Caroline Islands bringing heavy rains to Palau and Yap, and contributed to the formation of Tropical Storm 03W and Super Typhoon 04W (Ewiniar). The establishment of the monsoon trough across the western half of the Caroline Islands in late June brought widespread rainfall to almost all island groups in Micronesia except for Guam and the CNMI, where abundant rains did not arrive until early July when the very large Tropical Storm Bilis (05W) passed through the region.

Most statistical and coupled model forecasts indicate ENSO-neutral conditions in the tropical Pacific through the end of 2006, with **some of the models trending toward weak El Niño**. The spread of the most recent statistical and coupled model forecasts (ENSO-Neutral to weak El Niño) indicates uncertainty in the outlooks for the last half of the year. However, current conditions support those forecasts indicating that ENSO-Neutral conditions will continue for the next several months. Based upon this, **Near normal rainfall is anticipated throughout much of Micronesia, American Samoa and Hawaii for the next six months**. The following comments from the EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION were posted on the U.S. Climate Prediction Center web site on August 10, 2006:

***Synopsis:** ENSO-neutral conditions are expected to continue for the next one to three months, with a 50% chance that weak El Niño conditions will develop by the end of 2006.*

...The statistical and coupled model forecasts range from ENSO-neutral to weak warm (El Niño) episode conditions for the remainder of 2006 and into early 2007. The forecasts are consistent with the recent build up in upper-ocean heat content along the equator, indicating a trend toward warm-episode conditions. In the absence of any strong intraseasonal (Madden-Julian Oscillation – MJO) activity, a continued slow trend toward warm-episode conditions is expected. Therefore, ENSO-neutral conditions are expected to continue for the next one to three months, with a 50% chance that weak El Niño conditions will develop by the end of 2006.

CURRENT CONDITIONS

SST (Sea Surface Temperatures)

During the early months (JFM) of 2006, negative equatorial SST anomalies were observed at most locations between 180°W and 90°W, and negative SST departures were observed in all of the Niño regions, except for Niño 1+2 (along the equatorial Pacific coast of South America). By March, these persistent cool SSTs came very close to the La Niña threshold. During April through June, however, the equatorial strip had warmed somewhat, and by June positive SST anomalies expanded eastward, with SST anomalies greater than +0.5°C observed in most of the equatorial Pacific between 130°E and 140°W. From mid July through the mid-August, SSTs were greater than .5 C between 165°E and 150°W and between 80°W and 105°W. In the subsurface waters there has been a gradual warming that began in February, and by June, anomalies of up to + 2° C were observed at thermocline depth (150-200m below the surface).

Most statistical and coupled models predict slightly positive SST anomalies (ENSO-neutral to weak El Niño) in the Niño 3.4 region through the end of 2006. These forecasts are consistent with the recent increase in SST and build-up in upper-ocean heat content along the equator. Since the low-level easterlies have been near average, **it seems likely that ENSO-neutral conditions will continue at least for the next three months.** At this time, all measures of the Pacific climate are within the neutral range, and there are no indications of a major shift.

SOI (Southern Oscillation Index)

During the first 6 months of 2006, the value of the SOI was + 1.8, - 0.2, + 1.4, + 0.9, -0.8, and -0.7 for the months January through June, respectively. Whereas during the latter half of 2005 the SOI trended upward, during the first half of 2006 it reversed itself and trended downward with some large month-to-month variations. The 5-month running mean of the SOI centered on October 2005 was approximately zero, by February 2006 it peaked at + 0.74, and by April it had fallen back to +.12. With the climate expected to be in a state of ENSO-Neutral for the next few months, the SOI should average near zero for the next three to six months, with month-to-month fluctuations within the range of -1.0 to + 0.5. Normally, positive values of the SOI in excess of +1.0 are associated with La Niña, and negative values of the SOI below -1.0 are associated with El Niño. The SOI is an index representing the normalized sea level pressure difference between Darwin, Australia and Tahiti (or other sites representative of the western and eastern tropical Pacific, respectively).

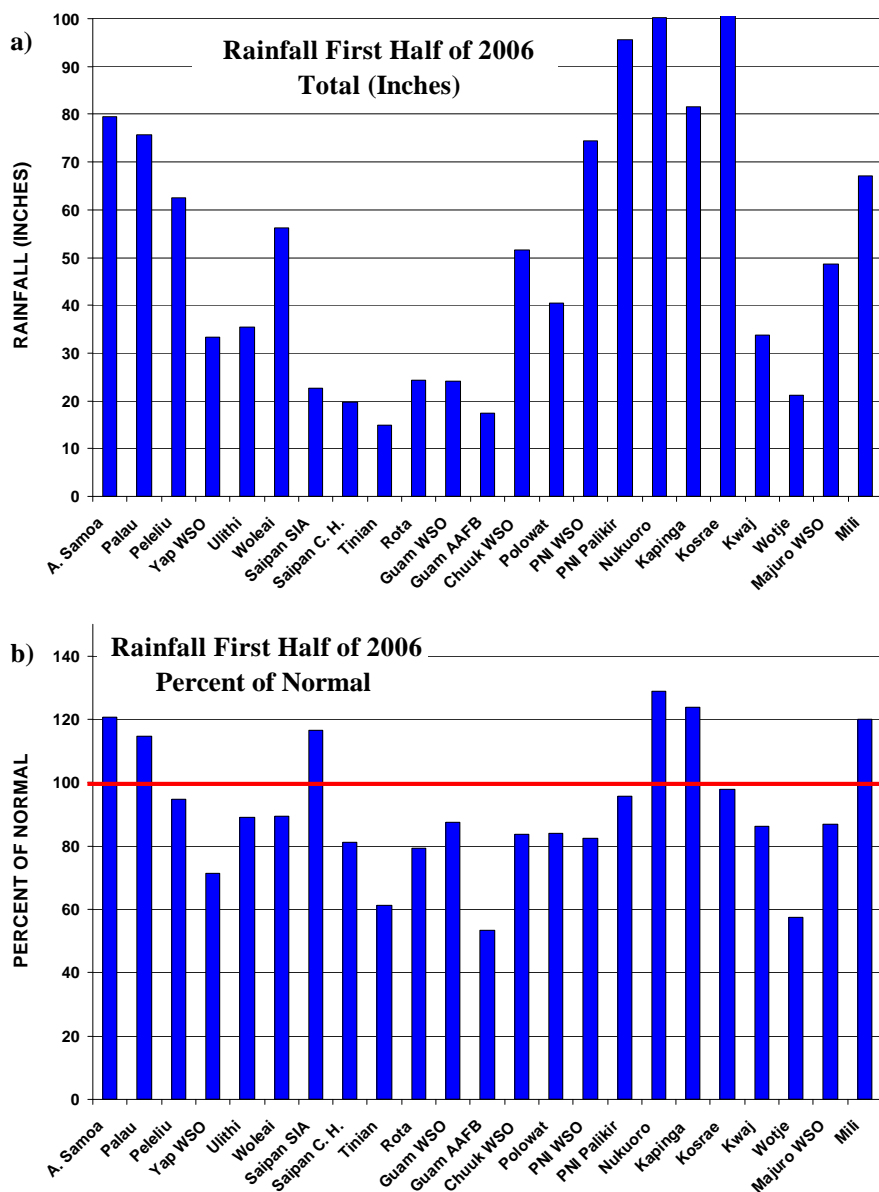


Figure 1. (a) Rainfall totals in inches and (b) anomaly (expressed as percent of normal) at the indicated islands for the 2nd quarter of 2006.

TROPICAL CYCLONE

The PEAC archives western North Pacific tropical cyclone numbers, track coordinates, and 1-minute average maximum sustained wind taken from operational warnings issued by the Joint Typhoon Warning Center (JTWC) of the U. S. Air Force and Navy, located at Pearl Harbor, Hawaii. Western North Pacific tropical cyclone names are obtained from warnings issued by the Japanese Meteorology Agency (JMA), which is the World Meteorological Organization's Regional Specialized Meteorological Center (RSMC) for the western North Pacific basin. The PEAC archives South Pacific tropical cyclone names, track coordinates, central pressure, and 10-minute average maximum sustained wind estimates from advisories issued by the Tropical Cyclone Warning Centers at Brisbane, Nadi, and Wellington. The numbering scheme and the 1-minute average maximum sustained wind estimates are taken from warnings issued by the JTWC. There are sometimes differences in the statistics (e.g., storm maximum intensity) for a given tropical cyclone among the agencies that are noted in this summary.

TROPICAL CYCLONE

For purposes of seasonal statistics, the JTWC archives Southern Hemisphere tropical cyclone activity for 2006 within the period July 2005 through June 2006. The **JTWC annual total of tropical cyclones in the southern hemisphere** for this past Southern Hemisphere cyclone season was **23**, which is **5 below the normal annual total of 28**. Ten of the cyclones reached hurricane status. By Ocean basin: there were 15 cyclones in the South Indian Ocean and 8 cyclones in the South Pacific. Cyclone Monica (23P) was the final cyclone of the Southern Hemisphere season, and reached an astonishing intensity of 155 knots sustained 1-minute wind speed as it tracked westward offshore the northern coastline of Australia's Northern Territory. TC Monica was the strongest tropical cyclone on record to affect Australia's Northern Territory. Monica's estimated maximum intensity was stronger than TC Tracy in 1974, TC Neville in 1992 and TC Ingrid in 2005. Monica was an unusual late season tropical cyclone and was the only cyclone to affect the NT area of responsibility in the 2005/06 season. A month earlier in March 2006, Cyclone Larry made landfall along the northeast coast of Australia near the town of Innisfail. Larry was a major cyclone earning the highest Category 5 intensity classification by the Australian Bureau of Meteorology.

In the **North Indian Ocean and Western North Pacific**, there were **7 tropical cyclones during the first half of 2006**: one in the Arabian Sea (TC 01A), two in the Bay of Bengal (TC 02B and TC 03B), and four in the **western North Pacific** (Tropical Storm 01W, Typhoon Chanchu (02W), Tropical Storm 03W, and Super Typhoon Ewiniar (04W)). Tropical Storm 01W and Tropical Storm 03W were not named by the JMA. Super Typhoon Ewiniar was first numbered by the JTWC on 30 June, but was later named by the JMA on 02 July. It became a super typhoon over water well northwest of Yap on July 5th. Ewiniar affected Yap (see local summary on p. 5). Shortly after Ewiniar formed in Micronesia, very large Tropical Storm Bilis (TC 05W) formed south of Guam. Moderately heavy rains were experienced throughout Guam, the CNMI, Yap and Palau as Bilis moved through this region of Micronesia (see further discussions of the impact of Bilis in the local summaries). The **western North Pacific typically experiences 5 or 6 numbered tropical cyclones through June of the calendar year**. Early season tropical cyclone activity in the western North Pacific is enhanced during El Niño years, and suppressed in the years that follow El Niño. During La Niña, basin-wide tropical cyclone numbers may be near normal, but the activity is typically shifted to the west.

In May 2006, the **Central Pacific Hurricane Center forecasted a slightly below average tropical cyclone season** (June 1—Nov. 30th) with **2 or 3 tropical cyclones** in the central Pacific basin. Thus far, Hurricane Daniel is the only tropical cyclone within the Central Pacific basin (140°W to 180°W). In late July, the remnants of Hurricane Daniel brought some gusty winds and heavy rainfall (2-5 inches) to areas of Maui and the Island of Hawaii.

PEAC Tropical Cyclone Outlook

The **PEAC tropical cyclone outlook for Micronesia** is for tropical cyclone development and movement patterns to be **displaced toward the west and north through August**, and then resume a **more normal spatial distribution from September through the remainder of the year**. The overall numbers of

TROPICAL CYCLONE

tropical storms and typhoons in the basin should be **near normal**. An observed shift of tropical cyclone tracks to the west of normal through early July should relax by fall, and thus the threat of a typhoon for Guam, the CNMI, Chuuk State, Yap State, and the Republic of Palau should be what is typical for these islands (see local variability summaries below). Islands from Pohnpei eastward into the RMI experience tropical storms and typhoons primarily during El Niño, so the risk of a damaging tropical cyclone in these locations is low.

The PEAC forecast considered input from two seasonal outlooks for tropical cyclone activity in the western North Pacific basin: (1) The City University of Hong Kong Laboratory for Atmospheric Research, under the direction of J. C-L. Chan, and (2) The Benfield Hazard Research Centre, UCL (University College London), Tropical Storm Risk (TSR) research group, UK, led by Dr Adam Lea and Professor Mark Saunders.

The Hong Kong group posted the following on its web site <http://weather.cityu.edu.hk/tc_forecast/2006_forecast_JUN.htm> in June.

The predicted number of all TCs (Tropical depressions, tropical storms and typhoons, (TD+TS+TY)) is 31.

The predicted number for tropical storms and typhoons (TS+TY) is 28.

The predicted number of typhoons (TY) is 18.

With these changes, the average predictions from all the potential predictors therefore call for a ***near-normal year for all TC categories for the entire WNP***.

[The mean numbers for these statistics from the JTWC are 31, 28, and 18 for (TD+TS+TY), (TS+TY) and (TY), respectively.]

The UK group posted the following on its website in June <<http://forecast.mssl.ucl.ac.uk/docs/TSRNWPForecastJun2006.pdf>>

June Forecast Update for Northwest Pacific Typhoon Activity in 2006, issued: 7th June 2006.

The TSR (Tropical Storm Risk) June forecast update for Northwest Pacific typhoon activity in 2006 anticipates a season with ***slightly above-average activity***. The forecast spans the full Northwest Pacific season from 1st January to 31st December 2006 (95% of typhoons historically occur after 1st May) and is based on data available through the end of May 2006. ... TSR's main predictor for overall activity is the forecast anomaly in August-September 2006 Niño 3.75 sea surface temperature (SST). We anticipate this will be $0.13 \pm 0.43^\circ\text{C}$ warmer than normal and thus slightly enhancing for activity. Monthly updated forecasts for intense typhoon numbers and the [Accumulated Cyclone Energy] ACE index will be issued through to early August 2006.

For **Hawaii**, the forecast for the rest of the tropical cyclone season (through November 30th) continues to be for a ***slightly below average cyclone season*** with 2 or 3 tropical cyclones in the Pacific basin.

An update on the **South Pacific cyclone season** will be provided in the next newsletter. At this time, the forecast conditions for SST indicate a possible busier than normal tropical cyclone season for Samoa.

LOCAL SUMMARY AND FORECAST



American Samoa: After an extremely wet summer monsoon in the heart of the rainy season, the rainfall during the 2nd Quarter of 2006 was quite dry, with a 3-month total of 17.88 inches (61%). On average the rainfall at Pago Pago is less than 10 inches in each of the months May through September. April's 5.15 inches represented an abrupt end to extreme wet conditions in American Samoa, and signaled an early start to the dry season.

American Samoa Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun	2nd Qtr	1st Half
Pago Pago WSO	Rain (Inches)	5.15	7.66	5.07	17.88	79.52
	% of Normal	43%	77%	67%	61%	121%
Aafasou	Rain (Inches)	8.37	13.01	9.16	30.54	118.51
	% of Normal	46%	85%	81%	81%	121%

Climate Outlook: American Samoa is now entering the heart of its dry season. Earlier computer models (and the official PEAC forecasts as well) indicated rainfall in American Samoa was likely to remain above normal as the island group entered its dry season. This was not the case for April through June as conditions were dry. Long-range computer rainfall forecasts have only limited skill in the tropical Pacific islands, and American Samoa is in a region where the effects of ENSO are more varied than at other locations. However, in July WSO Pago Pago received 8.27 inches (144% of normal) indicating that the dry conditions may be ending. For this outlook, a forecast based on climatology, persistence, and some computer model input **indicates near normal conditions with a normal onset to the next rainy season.**

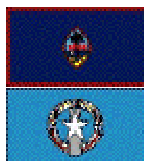
The threat of a damaging tropical cyclone in any of the islands of American Samoa is essentially over until the next rainy season (2006-07). After consultation with American Samoa WSO personnel, we agree that the threat of a damaging tropical cyclone is greatest during weak El Niño conditions. During strong El Niño's, the cyclone paths shift eastward into French Polynesia, and during La Niña, the cyclones tracks are shifted westward into the Coral Sea. With some climate models indicating a trend toward weak El Niño conditions in the latter half of 2006, there is the possibility of a busy cyclone season. Normal cyclone activity for an entire rainy season indicates that two or three named tropical cyclones would pass to the south of American Samoa producing episodes of heavy rainfall and gale force northwesterly winds.

Predicted rainfall for American Samoa from July 2006 through June 2007 is:

Inclusive Period	% of long-term average
July - Sep 2006 (Heart of Dry Season)	90%
Oct - Dec 2006 (Onset of Next Dry Season)	95%
Jan - Apr 2007 (Heart of next Rainy Season)	120% (contingent on an active monsoon and nearby tropical cyclones)
May - Jun 2007 (Onset of next Dry Season)	95%

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Guam/CNMI: Rainfall on Guam during the first half of 2006 was drier than normal at all reporting locations. It was especially dry during the 2nd Quarter when several three month totals were less than half of normal. A single heavy rain event on the 1st of June was raised the June monthly totals to above normal at several stations. June was otherwise rather dry, and wildfires were noted as late as the 1st of July. Most locations on Guam experienced six month rainfall totals between 20 and 25 inches during the first half of 2006, compared with a normal amount of approximately 30 inches during the dry season months of January through June. The drier-than-normal conditions exacerbated wildfires, and resulted in a drawdown in stream flows and water levels in the Fena Reservoir (a Navy-operated water system that supplies roughly 20% of Guam's commercial water and the water for the Naval Station). In early July, rainfall was abundant as Tropical Depression 05W resulted in up to 4 inches of rain in its two-day passage on the 7th and 8th of July. Hazardous surf on the west side of Guam generated by two tropical cyclones (Ewiniar (04W) and Bilis (05W)) and the monsoon winds south of them claimed the life of a 15-year-old boy.

Guam and CNMI Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun	2nd Qtr	1st Half
Guam						
GIA	Rain (Inches)	0.96	2.15	8.83	11.94	24.18
	% of Normal	26%	36%	136%	73%	88%
AAFB	Rain (Inches)	0.76	3.31	2.87	6.94	17.48
	% of Normal	16%	50%	45%	39%	53%
Dededo (Ypapa)	Rain (Inches)	1.80	4.05	2.77	8.62	25.38
	% of Normal	38%*	57%*	43%*	47%*	76%*
CNMI						
Saipan Intl. Airport	Rain (Inches)	2.35	1.93	4.35	8.63	22.66
	% of Normal	84%	44%	94%	73%	117%
Capitol Hill	Rain (Inches)	1.48	2.27	2.40	6.25	19.73
	% of Normal	42%	41%	42%	42%	81%
Tinian Airport	Rain (Inches)	2.02	2.49	4.02	8.53	14.91
	% of Normal	58%	45%	69%	58%	61%
Rota Airport	Rain (Inches)	1.74	3.71	2.78	8.23	24.30
	% of Normal	38%	59%	45%	48%	79%

* % of normal for Dededo is with respect to WSO Finigayan

LOCAL SUMMARY AND FORECAST

Rainfall totals at stations in the CNMI during the first half of 2006 were generally dry, especially in the 2nd Quarter when several three-month totals were less than half of normal. The monthly distribution of the rainfall in the CNMI was similar to that on Guam where the 1st Quarter totals were a little bit wetter than normal, and the 2nd Quarter totals were very dry. The 14.91 inches of rain at the Tinian Airport during the 1st half of 2006 was one of the lowest readings in all of Micronesia for this time period. Saipan Airport was the only station to report above normal rainfall during the first half of 2006 (mainly due to a wet January and February).

Climate Outlook: After a brief flirt with La Niña conditions in early 2006, the climate system has returned to ENSO-neutral. Many climate parameters (e.g., the number of tropical cyclones in the western North Pacific basin, the paths taken by tropical storms and typhoons, and the rainfall throughout most of Micronesia) are anticipated to be near normal. An observed shift of tropical cyclone tracks to the west of normal through early July should relax by fall, and thus the **threat of a typhoon for Guam and the CNMI** should be what is **typical for these islands: during the remainder of 2006** (and especially during the months of September through December) **two or three tropical storms and one or two typhoons should pass within 200 miles of any Guam and CNMI location.** The odds of typhoon force winds (or greater) at any location on Guam or in the CNMI during any given year (status of ENSO not considered) are approximately 1 in 7. During El Niño years, the odds of typhoon force winds on Guam or on any individual island in the CNMI rise to about 1 in 3. During non-El Niño years the odds fall back to around 1 in 10. Dangerous surf from a typhoon does not require that the typhoon pass close to any location, so it is certain that at least one episode of dangerous typhoon-generated waves will occur. Every year several lives are lost due to hazardous surf and the rip currents produced by them.

Rainfall is anticipated to be near normal for Guam and the CNMI during the **upcoming rainy season.** Depending on the tropical cyclone activity in the fall, it is possible that some locations could see above normal rainfall in the months of September through December. Predicted rainfall for the Mariana Islands from July 2006 through June 2007 is as follows:

Inclusive Period	% of long-term average	
	Guam/Rota	Saipan/Tinian
July - Sep 2006 (Heart of Rainy Season)	100%	95%
Oct - Dec 2006 (End of Rainy Season)	110%	100%
Jan - Mar 2007 (1st half Next Dry Season)	110%	100%
Apr - Jun 2007 (2nd half Next Dry Season)	100%	100%

For more information on
Guam's weather and climate go to
www.weather.gov/guam

LOCAL SUMMARY AND FORECAST



Federated States of Micronesia

Yap State: Rainfall throughout Yap State during the first half of 2006 was slightly drier than normal at all reporting locations. On Yap Island, the 2nd Quarter rainfall totals at most stations was between 20 to 25 inches, with the WSO among the drier readings. For the whole first half of 2006, the total rainfall at most Yap Island stations was between 35 and 40 inches. On the outer islands of Yap State conditions were also slightly drier than normal for most months of the first half of 2006, and drier than normal for the 6-month total. In all of Yap State, the highest 2nd Quarter rainfall total, and the highest total for the first half of 2006, occurred at Woleai with 26.67 inches and 56.10, inches respectively. Woleai, at its more southern location, is normally wetter than Yap Island and Ulithi.

During the morning of the first day of July 2006, Tropical Storm Ewiniar (TC04W) passed approximately 40 miles to the southwest of Yap. Gale-force winds rose suddenly in the mid-morning, and persisted for a few hours. The peak wind at the WSO was 40 knots (1-minute sustained) with a gust to 53 knots. The minimum SLP was 995 mb. The 24-hour rainfall during the storm was 2.33 inches at the WSO. This relatively weak tropical storm caused a surprising amount of damage on Yap Island from sea inundation. The highest waves during the storm came at high tide, and there was substantial inundation that flooded coastal

Yap State Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun.	2nd Qtr	1st Half
Yap Proper						
Yap WSO	Rain (Inches)	3.40	8.45	9.14	20.99	33.35
	% of Normal	59%	93%	72%	76%	71%
Dugor*	Rain (Inches)	3.36	10.86	8.30	22.52	38.87
Gilman*	Rain (Inches)	3.65	9.14	8.15	20.94	36.08
Luweech*	Rain (Inches)	4.57	11.05	11.66	27.28	41.38
Maap*	Rain (Inches)	2.37	9.49	9.01	20.87	38.49
North Fanif*	Rain (Inches)	3.08	8.99	6.68	18.75	35.84
Rumung*	Rain (Inches)	2.76	10.50	12.44	25.70	43.25
Tamil*	Rain (Inches)	2.99	7.95	10.00	20.94	40.83
Outer Islands						
Ulithi	Rain (Inches)	3.05	8.14	9.78	20.97	35.36
	% of Normal	62%	106%	91%	90%	89%
Woleai	Rain (Inches)	8.58	11.06	7.03	26.67	56.10
	% of Normal	78%	91%	54%	74%	90%

* Long term normal is not established for these sites

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roads and damaged some homes. Actual sea heights were approximately half of those generated by Typhoon Sudal. A boat at mooring broke loose and damaged the official tide gage in Colonia.

Climate Outlook: Nearly all of the western North Pacific tropical cyclones for the first half of 2006 affected Yap in their early stages of development. For the rest of 2006 the **tropical cyclone threat** for Yap should be **near normal**, with the **greatest threat occurring in the months of September through December**. In the latter half of 2006, approximately 2 or 3 tropical cyclones should pass close enough to Yap (and/or its outer islands) to cause gales. The threat of a direct strike by a typhoon at Yap Island and at Ulithi is roughly one-half to two-thirds that of Guam and the CNMI. The threat is even less at Woleai. While we expect no direct strikes by a typhoon of any island or atoll of Yap State during 2006, residents should always be prepared for the possibility.

Predicted rainfall for Yap State from July 2006 through Jun 2007 is as follows:

Inclusive Period	% of long-term average	
	Yap and Ulithi	Woleai
July - Oct 2006 (Heart of Rainy Season)	100%	100%
Nov 2006 - Jan 2007 (Onset of Dry Season)	110%	110%
Feb - May 2007 (Heart of Next Dry Season)	100%	100%
Jun - Jul 2007 (Heart of Next Dry Season)	100%	110%

Chuuk State: During the 2nd Quarter of 2006 as well as for the whole first half of 2006, there was a north-south gradient of rainfall across the islands of Chuuk State, with the islands located further south generally experiencing more rainfall than those islands and atolls further north. With respect to the Chuuk WSO, only recording locations to its north (for example, Fananu and Onoun) were drier, while locations to the south (for example, Ettal and Ta) were somewhat wetter. The WSO Chuuk had 51.55 inches of rainfall during the first half of 2006. This was 84% of normal. Recording locations in the Mortlocks topped the list of Chuuk recording sites in amount of rainfall with 62.66 inches, 62.11 inches and 60.10 inches at Nama, Ettal, and Ta respectively. Only some recording locations within the Chuuk Lagoon and in the northern atolls received rainfall totals less than 45 inches during the first half of 2006. Polowat, which tends to be among the drier locations in Chuuk State had 40.35 inches for the first half of 2006 which was roughly 84% of normal for that location.

Climate Outlook: The **tropical cyclone threat for 2006** should be **near normal**, with the **greatest threat** occurring in the months of **October through January 2007**. Most of the numbered tropical cyclones in the western North Pacific basin through July 2006 began as tropical disturbances passing through Chuuk State where they provided some episodes of heavy rainfall. This weather pattern should continue through September 2006, with tropical disturbances providing short (2-4 day) periods of heavy rain showers in Chuuk State, interspersed with dry breaks of up to one week in duration. In the latter three

LOCAL SUMMARY AND FORECAST

Chuuk State Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun.	2nd Qtr	1st Half
Chuuk Lagoon						
Chuuk WSO	Rain (Inches)	6.12	17.05	9.72	32.89	51.55
	% of Normal	50%	139%	81%	90%	84%
Piis Panew*	Rain (Inches)	1.34	14.85	5.97	22.16	33.34
Xavier H. School*	Rain (Inches)	4.34	14.64	9.00*	27.98	46.77
Southern Mortlocks						
Lukunoch*	Rain (Inches)	17.08	7.26	9.03	33.37	55.86
Ettal*	Rain (Inches)	15.42	8.14	13.72	37.28	62.11
Ta*	Rain (Inches)	15.84	4.78	10.89	31.51	60.10
Northern Atolls						
Fananu*	Rain (Inches)	4.75	12.04	10.15	26.94	41.53
Onoun*	Rain (Inches)	4.12	11.62	4.77	20.51	33.74
Northern Mortlocks						
Losap*	Rain (Inches)	7.74	9.04	13.41	30.19	51.52
Nama*	Rain (Inches)	3.65	18.10	14.16	35.91	62.66
Western Atolls						
Polowat	Rain (Inches)	7.68	12.54	2.35	22.57	40.36
	% of Normal	128%	139%	19%	82%	84%

* Long term normal is not established for these sites

months of the year, tropical disturbances should continue to form near Chuuk, but the point at which they become tropical storms should extend eastward, resulting in an increase chance of gale force winds and extreme rainfall events (10 inches or more in 24 hours) in Chuuk State. From October 2006 through January 2007, approximately 2 or 3 numbered tropical cyclones should pass through Chuuk State causing gales on some islands and heavy rainfall throughout most of the region. The threat of a direct strike by a typhoon at any island or atoll in Chuuk State is roughly one-third to one-half that of Guam and the CNMI. While we expect no direct strikes by a typhoon of any island or atoll of Chuuk State during 2006, residents should always be prepared for the possibility.

As a result of a normal distribution of tropical disturbances, and other weather patterns that govern the rainfall in Micronesia, rainfall amounts should be near normal on most islands and atolls of Chuuk State for the next 3 to 6 months. In the final 3 months of 2006, several tropical disturbances, one or two tropical depressions and one or two tropical storms could form in

LOCAL SUMMARY AND FORECAST

Chuuk State bringing some heavy rain events that would push the 2006 annual rainfall totals to slightly above normal at some islands.

Predictions for Chuuk State from July 2006 through June 2007 are as follows:

Inclusive Period	% of long-term average			
	Chuuk Lagoon Losap and Nama	Polowat	Northern Islands	Mortlocks
July - Sep 2006	105%	100%	100%	100%
Oct - Dec 2006	115%	110%	110%	115%
Jan - Mar 2007	100%	100%	100%	110%
Apr - Jun 2007	100%	100%	90%	100%

Pohnpei State: During the 2nd Quarter of 2006, the rainfall throughout Pohnpei State was near normal on Pohnpei Island. Pingelap and at Mwoakilloa were drier than most locations on Pohnpei Island. Nukuoro and Kapingamarangi were wetter than normal. It has been wetter than normal on Kapingamarangi for a very long time (perhaps because of the effects of continually warmer than normal SST on the cloud systems in the area).

The 2nd Quarter rainfall total of 56.42 inches at Palikir was the highest reading in Pohnpei State, followed by 53.49 inches at Nukuoro. The 100.25 inches of rain at Nukuoro during the first 6 months of 2006 was one of the highest rain readings in all of

Pohnpei State Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun.	2nd Qtr	1st Half
Pohnpei Island						
Pohnpei WSO	Rain (Inches)	14.12	17.61	16.47	48.30	74.38
	% of Normal	86%	92%	96%	92%	83%
Palikir	Rain (Inches)	14.52	22.83	19.07	56.42	95.64
	% of Normal	80%	108%	100%	96%	96%
Nahna Laud*	Rain (Inches)	28.24	20.93	N/A	N/A	N/A
Atolls of Pohnpei State						
Nukuoro	Rain (Inches)	23.35	15.04	15.10	53.49	100.25
	% of Normal	156%	102%	124%	128%	129%
Pingelap	Rain (Inches)	7.02	13.01	12.82	32.85	67.93
	% of Normal	41%	76%	79%	65%	76%
Mwoakilloa*	Rain (Inches)	7.73	10.55	15.63	33.91	60.33
Kapingamarangi	Rain (Inches)	14.50	3.19	19.06	36.75	81.53
	% of Normal	107%	31%	263%	118%	124%

* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

Micronesia for that period.

Rainfall on top of Nahna Laud (the highest mountain in the interior rainforest of Pohnpei island) continued to be generally higher than at any other location. The rain gages at that site have been in operation for three years as a joint project between UOG and the Conservation Society of Pohnpei (CSP) sponsored by the U.S. Geological Survey. Twelve-month totals at the Nahna Laud site have reached as high as 331 inches.

Climate Outlook: The risk of a damaging tropical storm or typhoon at any island in Pohnpei State is unlikely during 2006. The early stages of developing tropical cyclones may bring some episodes of heavy rain to Pohnpei for the remainder of the year, but these systems should not become tropical storms or typhoons until they move well away from Pohnpei.

Normal rainfall conditions are expected throughout Pohnpei State for the remainder of 2006. The rainfall at Kapingamarangi continues to exceed expectations. The three driest months on Kapingamarangi are typically August, September and October. Based on continually wet conditions there for the past two years, and a similar pattern of SST as during the past two years, the rainfall at Kapingamarangi may continue to be wet.

Predicted rainfall for Pohnpei State from July 2006 through Jun 2007 is as follows:

Inclusive Period	% of long-term average	
	Pohnpei Island and atolls	Kapingamarangi
July - Sep 2006	100%	110%
Oct - Dec 2006	100%	100%
Jan - Mar 2007	100%	100%
Apr - Jun 2007	110%	95%?

Kosrae State: Rainfall was abundant on Kosrae during the first half of 2006. While islands further to the north (such as Kwajalein) were dry, Kosrae at its low latitude (6° N) stayed in the narrow zone of heavy rainfall along the axis of the trade wind trough (sometimes called the ITCZ). Though 2nd Quarter rainfall totals at Kosrae were slightly dry, the heavy 1st Quarter totals pushed the amount of rainfall during the first half of the year on Kosrae to the highest recorded values in all of Micronesia. The 1st half of 2006 rainfall at Tofol (a village on the east side of the island) was 106.55 inches and this was the highest

Kosrae State Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun.	2nd Qtr	1st Half
Airport (SAWRS)	Rain (Inches)	20.84	12.99	13.95	47.78	106.54
	% of Normal	96%	69%	73%	80%	98%
Utwa*	Rain (Inches)	21.34	7.11	10.39	38.84	101.04
Tofol*	Rain (Inches)	21.44	14.49	11.79	47.72	106.55
Nautilus*	Rain (Inches)	19.60	11.44	9.21	40.25	95.64

* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

rainfall total recorded in Micronesia for that time period. The rainfall at Kosrae Supplemental Aviation Weather Reporting Station (SAWRS) (located at the airport on the north side of the island) was almost exactly the same at 106.54 inches. This is a lot of rain by many standards, but was actually 98% of the normal value for the SAWRS station. Rainfall at other locations on the island of Kosrae was slightly drier than at Tofol and SAWRS.

Climate Outlook: The risk of a damaging tropical storm or typhoon is very unlikely at Kosrae during 2006. The very early stages of developing tropical cyclones may bring some episodes of heavy rain to Kosrae, but these systems should not become tropical storms or typhoons until they are well away from Kosrae.

Overall for the next 3 to 6 months (and beyond into the first half of 2007), the rainfall on Kosrae is expected to be **near normal**.

Predicted rainfall for Kosrae State from July 2006 through June 2007 is as follows:

Inclusive Period	% of long-term average
Jul - Dec 2006	100%
Jan - Mar 2007	110%
Mar - Jun 2007	100%



Republic of Palau: During the first half of 2006, the rainfall throughout most of Palau was near normal. January and June were particularly wet with monthly rainfall exceeding 20 inches at some locations (26.45 inches at the Airport, and 21.43 inches at the WSO, Koror). The driest month of the year (so far) was February with less than 10 inches at many locations. The highest monthly rainfall totals at recording locations in Palau most often to occur at the International Airport; the lowest monthly rainfall totals are often seen at Peleliu. Palau has a complex pattern of monthly rainfall with the highest average rainfall in the months of June and July; the lowest average rainfall in the months of February, March and April; and a secondary minimum in September. The annual migration of the monsoon trough across Palau and the paths taken by tropical cyclones in response to the position of the monsoon trough govern the behavior of the mean monthly rainfall on Palau.

Republic of Palau Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun.	2nd Qtr	1st Half
Koror WSO	Rain (Inches)	8.85	10.27	16.49	35.61	75.70
	% of Normal	102%	86%	95%	94%	115%
Nekken*	Rain (Inches)	7.46	13.04	18.40	38.90	74.83
Intl. Airport*	Rain (Inches)	8.78	12.51	20.35	41.64	88.22
Peleliu*	Rain (Inches)	5.38	9.99	15.10	30.47	62.40

* Long term normal is not established for these sites

LOCAL SUMMARY AND FORECAST

Because of the westward shift in tropical cyclone formation during the first half of 2006, Palau was in the path of some of the few tropical disturbances that moved from western Micronesia towards the Philippines. One of these disturbances became the first numbered tropical cyclone of 2006 (TC 01W), which passed well south of Palau in early March. When Tropical Storm Ewiniar passed close to Yap on the 1st of July, it also affected Palau with gusty westerly winds and heavy rain showers. Peak gusts reached 37 knots at the WSO, Koror, and 46 knots at the International Airport. Minimum sea level pressure fell to 1006.8 mb at the WSO Koror. Peak 24-hour rainfall from this tropical cyclone was 1.88 inches. A direct strike by a typhoon is not expected to occur on any island in the Republic of Palau during 2006, however, the tendency so far this year for some of the basin's tropical cyclones to pass close enough to Palau to cause gusty west and southwest winds and some heavy showers should continue for the remainder of the year into January of 2007.

Climate Outlook: In general, most tropical storms and typhoons that move past Palau stay well to the north, but westerly gales, heavy rain showers, and rough seas are often experienced as they move by. **During the remainder of 2006**, there should be **several episodes of heavy rainfall** and 2 or 3 occurrences of **gusty westerly winds and rough seas** from tropical cyclones passing to the north.

Rainfall throughout Palau is anticipated to be **near normal for most months of the year**, with some large month-to-month variations attributed to the episodic nature of rainfall associated with tropical cyclones passing to the north, and other short-term enhancements related to the behavior of the monsoon trough.

Predicted rainfall for Palau from July 2006 through June 2007 is as follows:

Inclusive Period	% of long-term average
July - Sep 2006	110%
Oct - Dec 2006	100%
Jan - Apr 2007 (driest months)	95%
May - Jun 2007	100%



Republic of the Marshall Islands (RMI): During the 2nd Quarter of 2006, the very dry conditions in the northern RMI abated somewhat, especially at Kwajalein where there was 11.54 inches of rain in May. Islands in the central and southern portion of the RMI had abundant rains, especially on those islands south of Majuro. Mili reported the highest rainfall in the RMI for both the 2nd Quarter (36.23 inches) and for the first half of the year (67.13 inches).

Climate Outlook: The RMI has a very low risk of a tropical storm or typhoon during 2006. There is a slight chance that a tropical depression or weak tropical storm could move from the central Pacific into the Marshall Islands during late August through early October. From October through December 2006, the monsoon trough may extend into the central and southern RMI to allow for some episodes of heavy rainfall from tropical disturbances.

The northern atolls of the RMI have been generally drier than normal for a long time. It **should not be quite as dry in the northern RMI through the next half of 2006**. The central

LOCAL SUMMARY AND FORECAST

and southern atolls should have **near normal rainfall**. Next year's dry season in the northern RMI is once again anticipated to be drier than average, but not as dry as it has been in recent dry seasons.

RMI Rainfall Summary 2nd Qtr 2006

Station		Apr.	May	Jun	2nd Qtr	1st Half
RMI Central and Southern Atolls						
Majuro WSO	Rain (Inches)	7.31	6.29	11.55	25.15	48.54
	% of Normal	71%	56%	100%	76%	87%
Laura	Rain (Inches)	8.39	3.79	N/A	N/A	N/A
	% of Normal	N/A	N/A	N/A	N/A	N/A
Aling-laplap	Rain (Inches)	9.92	10.86	10.23	31.01	57.06
	% of Normal	111%	103%	96%	103%	120%
Mili	Rain (Inches)	12.17	11.60	12.46	36.23	67.13
	% of Normal	118%	104%	108%	110%	120%
RMI Northern Atolls						
Kwajalein	Rain (Inches)	5.81	11.54	7.06	24.41	33.69
	% of Normal	77%	116%	73%	90%	86%
Utirik	Rain (Inches)	1.50	3.11	2.75	7.36	9.82
	% of Normal	23%	37%	34%	32%	30%
Wotje	Rain (Inches)	2.65	5.34	6.11	14.05	21.17
	% of Normal	37%	56%	67%	54%	57%

Predicted rainfall for the RMI from July 2006 through June 2007 is as follows:

Inclusive Period	% of long-term average		
	South of 6°N	6°N to 8°N	North of 8°N
July - Sep 2006	100%	105%	100%
Oct - Dec 2006	110%	110%	100%
Jan - Mar 2007	100%	100%	100%
Apr - Jun 2007	100%	100%	90%



Hawaii: For the State of Hawaii, the 2nd Quarter of 2006 was much drier than the extremely wet 1st Quarter. In April most of the gauges across Kauai County, Maui County and the Island of Hawai'i recorded below normal totals. On Oahu, rainfall ranged from well below normal to above normal. In May, the northern half of the state (Oahu and Kauai) tended to be drier and the southern half (Maui County and the Island of Hawaii) tended to be in the near to

LOCAL SUMMARY AND FORECAST

above normal range. In June, most of the stations throughout the state recorded below normal rainfall. Additional individual rainfall station information and specific island information for Hawaii can be found in the Monthly Precipitation Summaries which are located online at <http://www.prh.noaa.gov/hnl/pages/hydrology.php>.

Although the 2nd quarter totals have been drier than normal, the overall rainfall for the 1st half of 2006 remains near to above normal for most of the state. This is due to the extremely wet conditions in the first half of 2006. For nearly 7 weeks between the middle of Feb and the beginning of April, most of Hawaii had an unprecedented extended wet period. During March several stations (Waimanalo, Pahala, Moloaa) broke their March record and Lihue had its wettest month ever with 36.13 inches of rain (1009% of normal). More detailed information on this event is located on line at <http://www.prh.noaa.gov/hnl/pages/events/weeksrain/weeksrainsummary.php>

Additional individual rainfall station information and specific island information for Hawaii can be found in the Monthly Precipitation Summaries which are located online at <http://www.prh.noaa.gov/hnl/pages/hydrology.php>.

State of Hawaii Rainfall Summary (for select stations)
2nd Qtr 2006

Station		Apr.	May	Jun	2nd Qtr	1st Half
Lihue Airport	Rain (Inches)	1.31	1.31	0.77	5.83	50.04
	% of Normal	44%	46%	42%	44%	205%
Honolulu Airport	Rain (Inches)	0.75	1.15	0.09	1.33	23.12
	% of Normal	68%	147%	21%	86%	249%
Kahului Airport	Rain (Inches)	0.2	0.75	0.03	0.92	6.58
	% of Normal	11%	114%	13%	37%	59%
Hilo Airport	Rain (Inches)	8.69	22.51	4.19	34.53	81.69
	% of Normal	69%	279%	57%	96%	134%

Climate Outlook:

According to the Climate Prediction Center's official forecast for Hawaii, dynamical and statistical tools predict **a tendency towards below normal temperatures from ASO (August-September-October) 2006 to SON (September-October-November) 2006**. The Climate Predictions Center's dynamical and statistical tools give **equal chances for above normal rainfall, near normal rainfall and below normal rainfall for the next several seasons**. This forecast reflects the difficulty in predicting rainfall patterns during non El Nino and non La Nina years.

**For more information on
Hawaii's weather and climate go to
www.weather.gov/hawaii**

EXPERIMENTAL SEA LEVEL FORECASTS

The following sections describe: (i) the CCA-based forecasts for sea level deviations for the forthcoming season, and (ii) the observed monthly sea level deviations. All units are in inches. Note that deviations are defined here as the difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value computed at each station. Also, note that the forecasting technique adapted here does not account for sea level deviations created by other atmospheric or geological conditions such as tropical cyclones, storm surges or tsunamis.

(i) Seasonal Sea Level Forecast for JAS, ASO, and SON 2006

Forecasts of the sea level anomalies in the USAPI are presented using CCA statistical model. Locations of all stations are shown in Fig 2. Based on the independent SST values in AMJ 2006, the resulting CCA model was used to forecast the sea level of three consecutive months: Jul-Aug-Sep (JAS), Aug-Sep-Oct (ASO), and Oct-Nov-Dec (OND) (Table 1). CCA cross-validation forecast skills for 0, 1, and 2-month leads are available online (see Table 1).

Table 1: Forecasts of sea level deviation (in inches) for JAS:Jul-Aug-Sep, ASO:Aug-Sep-Oct, and OND:Oct-Nov-Dec

Tide Gauge	JAS	ASO	SON	Forecast Quality ¹	<p>1. Forecast quality is a measure of the expected CCA cross-validation correlation skill. In general terms, these forecasts are thought to be of useful skill (or at least fair skill) if the CCA cross-validation value is greater than 0.3. Higher skills correspond to greater expected accuracy of the forecasts. Skill levels greater than 0.4 and 0.5 are thought to be moderate and good, while skill levels greater than 0.6 and 0.8 are thought to be strong and very strong respectively. For more information on the forecast skill, go to the PEAC website at www.soest.hawaii.edu/MET/Enso/peu/2006_3rd/Sea_Level.htm</p> <p>2. The lead time is the time interval between the end of the initial period and the beginning of the forecast period. For example, lead-0, lead-1M, and lead-2M means 'sea-level' of target season 0 (JAS), 1 (ASO), and 2 (SON) month leads based on SSTs of Apr-May-Jun.</p> <p>Note: (-) indicates negative deviations (fall of sea level from the mean), and (+) indicates positive deviations (rise of sea level from the mean), N/A: data not available. Deviations of +/-1 in. are considered negligible and denoted by **. Deviations +/- 2 in. are unlikely to cause any adverse climatic impact.</p>
Lead time ²	0	1M	2M		
Guam	+5	+3	**	Good	
Malakal	+2	+2	+2	V. Strong	
Yap	+2	+2	**	Strong	
Pohnpei	**	**	**	Strong	
Kapingamarangi	+2	+2	+2	Strong	
Majuro	**	+1	+2	Good	
Kwajalein	+1	+1	**	Good	
Pago Pago	+4	+3	+3	Strong	

As in the previous season (AMJ), this season (JAS) provided very skillful forecasts (Table 1). Most of the tide gauge stations show strong skill level (Table 1). Only Majuro and Kwajalein displayed a relatively lower skill, which is still reasonably well predicted (skill level is 0.5 or more). With a mean skill greater than 0.67 (at 0 to 2-months lead time) in all three consecutive seasonal (JAS, ASO, and SON), the tide gauge stations are very well predicted.

In the last newsletter, all of the tide gauge stations were predicted to have higher than normal sea levels for AMJ. For the next three seasons (JJA, ASO and SON), the tide gauge stations will continue to have slightly higher than normal sea levels. The higher positive deviations are forecast for the westernmost stations (Guam, Malakal, Yap) and the near equatorial area near Kapingamarangi. Further east, Pohnpei, Kwajalein and Majuro are likely to display less positive deviations. In the South Pacific, the vicinity of Pago Pago is forecast to have a positive deviation in sea level.

EXPERIMENTAL SEA LEVEL FORECASTS

(ii) Observed monthly sea level deviation in Apr-May-Jun (AMJ), 2006

The monthly time series (April to June) for sea level deviations have been taken from the UH Sea Level Center. The full time series (in mm) is available at <ftp://ilikai.soest.hawaii.edu/islp/slpp/deviations>. Deviations are defined here as the difference between the mean sea level for the given month and the 1975 through 1995 mean sea level value computed at each station.

Table 2 provides the monthly observed sea level deviations (in inches). In the last quarter (AMJ: 2nd quarter of 2006), all the tide gauge stations recorded a monthly sea level which was higher than normal. Majuro recorded only slight positive deviations. Amongst the others, Guam continued to record considerable rise in this quarter (12.8, 9.4, and 7.8 inches in April, May, and June respectively). Other stations that recorded considerable rises are: Malakal at Palau, Pohnpei at FSM, and Pago-Pago at American Samoa (**Table 2**).

In the last quarter's issue, we forecasted positive deviations for all the tide gauge stations in AMJ (**Fig. 3 dotted line**). The observed Real-time sea-level data in AMJ was consistent with the forecast values (**Fig. 3**). In all cases, the observed values were found to be positive (higher than normal sea level). Yap, Kwajalein, Majuro, Kapingamarangi, and Pago-Pago maintained a close match with the forecast values. However, Guam and Malakal, Palau remained relatively under forecast.

Table 2 : Monthly observed sea level deviations in inches (year to year standard deviation in parentheses)

Tide Gauge Station	Apr	May	Jun	Average observed/forecast seasonal sea-level deviations																											
Marianas, Guam	+12.8 (4.4)	+9.4 (4.1)	+7.8 (3.6)	<table border="1"><caption>Data for Figure 3: Average Observed/ forecast seasonal sea level deviations (inches)</caption><thead><tr><th>Station</th><th>Observed (AMJ)</th><th>Forecast (AMJ)</th></tr></thead><tbody><tr><td>Guam</td><td>12.8</td><td>7.5</td></tr><tr><td>Malakal</td><td>5.4</td><td>1.0</td></tr><tr><td>Yap</td><td>1.6</td><td>3.2</td></tr><tr><td>Kwaja</td><td>5.6</td><td>4.5</td></tr><tr><td>Mejuro</td><td>2.7</td><td>1.8</td></tr><tr><td>Pohnpei</td><td>6.5</td><td>4.0</td></tr><tr><td>Kaping</td><td>3.6</td><td>3.2</td></tr><tr><td>PgoPgo</td><td>6.8</td><td>4.5</td></tr></tbody></table>	Station	Observed (AMJ)	Forecast (AMJ)	Guam	12.8	7.5	Malakal	5.4	1.0	Yap	1.6	3.2	Kwaja	5.6	4.5	Mejuro	2.7	1.8	Pohnpei	6.5	4.0	Kaping	3.6	3.2	PgoPgo	6.8	4.5
Station	Observed (AMJ)	Forecast (AMJ)																													
Guam	12.8	7.5																													
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Kaping	3.6	3.2																													
PgoPgo	6.8	4.5																													
Malakal, Palau	+5.4 (4.6)	+7.8 (4.7)	+7.5 (4.2)																												
Yap, FSM	+1.6 (3.8)	+5.5 (3.4)	+6.4 (4.1)																												
Kwajalein, Marshalls	+5.6 (2.1)	+5.0 (2.5)	+4.0 (2.2)																												
Majuro, Marshalls	+2.7 (1.9)	+1.1 (1.9)	+0.1 (2.1)																												
Pohnpei, FSM	+6.5 (2.0)	+3.5 (2.3)	+1.4 (2.7)																												
Kapingamarangi, FSM	+3.6 (3.0)	+1.6 (2.9)	+1.6 (2.6)																												
Pago-Pago, A Samoa	+6.8 (3.7)	+5.2 (4.3)	+4.8 (3.6)																												

Note: - indicate negative deviations (fall of sea-level from the mean), and + indicate positive deviations (rise of sea-level from the mean), n/a: data not available, Figures in parenthesis are year-to-year SD (standard deviations) for the month.

Pacific ENSO Update

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ENSO FORECAST

Excerpt from PROGNOSTIC DISCUSSION FOR LONG-LEAD OUTLOOKS

NOAA-NWS-Climate Prediction Center-Camp Springs, MD—8:30 EST Thursday July 20, 2006

http://www.cpc.ncep.noaa.gov/products/predictions/long_range/fxus05.html

SSTs along the equator in the Pacific are mostly within .5 deg C of normal. The SSTs in the Niño 3.4 region... A critical indicator for the ENSO state... Currently average about .3 deg c above normal. Both the low level and upper level winds in the tropical pacific averaged close to normal in the last month or so. These indicators suggest that ENSO is in a neutral phase. Convection patterns in the equatorial Pacific appear to be influenced by very weak Madden-Julian oscillation (MJO) activity. The heat content in the equatorial Pacific Ocean has increased markedly in the last five months... And is now noticeably above the long term average....

EL NINO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

Issued by NOAA NWS Climate Prediction Center - Aug 10, 2006

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/

Synopsis: *ENSO-neutral conditions are expected to continue for the next one to three months, with a 50% chance that weak El Niño conditions will develop by the end of 2006.*

Equatorial surface and subsurface temperature anomalies increased during July 2006, with SST anomalies greater than +0.5C observed in most of the equatorial Pacific between 130°E and 140°W. As a result, positive SST anomalies were observed in all of the Niño regions. During July, low-level (850-hPa) easterly winds were weaker than average across most of the equatorial Pacific, and the Southern Oscillation Index (SOI) was negative for the third consecutive month. Beginning in February the basin-wide upper ocean heat content increased, and since early April positive anomalies have been observed. Positive upper-ocean heat content anomalies are usually a precursor to warm (El Niño) episodes.

The statistical and coupled model forecasts range from ENSO-neutral to weak warm (El Niño) episode conditions for the remainder of 2006 and into early 2007. The forecasts are consistent with the recent build up in upper-ocean heat content along the equator), indicating a trend toward warm-episode conditions. In the absence of any strong intraseasonal (Madden-Julian Oscillation – MJO) activity, a continued slow trend toward warm-episode conditions is expected. Therefore, ENSO-neutral conditions are expected to continue for the next one to three months, with a 50% chance that weak El Niño conditions will develop by the end of 2006.

The Pacific ENSO Update is a bulletin of the Pacific El Niño-Southern Oscillation (ENSO) Applications Center (PEAC). PEAC conducts research & produces information products on climate variability related to the ENSO climate cycle in the U.S.-affiliated Pacific Islands (USAPI). This bulletin is intended to supply information for the benefit of those involved in such climate-sensitive sectors as civil defense, resource management, and developmental planning in the various jurisdictions of the USAPI.

The Pacific ENSO Update is produced quarterly both online and in hard copy, with additional special reports on important changes in ENSO conditions as needed. For more information about this issue please contact the editor, Nicole Colasacco at Nicole.colasacco@noaa.gov or at the address below.

Publication of the Pacific ENSO Update is supported by the National Oceanic and Atmospheric Administration (NOAA), National Weather Service-Pacific Region Headquarters. The views expressed herein are those of the author(s) and do not necessarily reflect the views of NOAA, any of its sub-agencies, or cooperating organizations.

ACKNOWLEDGEMENTS AND FURTHER INFORMATION

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